

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
RUI XIE, et al.) : Examiner: Sergent, R.A.
Application No.: 09/919,994) : Group Art Unit: 1711
Filed: August 2, 2001) : Confirmation No.: 8016
For: HIGH PERFORMANCE POLYURETHANE) : May 8, 2009
ELASTOMERS FROM MDI PREPOLYMERS WITH) :
REDUCED CONTENT OF FREE MDI MONOMER)

MAIL STOP APPEAL BRIEF -- PATENTS

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and Trademark Office
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APPELLANTS' AMENDED BRIEF ON APPEAL
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

In response to the Notice of Defective Appeal Brief mailed on April 28, 2009, and pursuant to 37 C.F.R. § 41.37, submitted herewith for the above-identified application is Appellants' Amended Appeal Brief. A Notice of Appeal, along with a Pre-Appeal Brief Request, was filed on August 19, 2008, to appeal the decision of the Final Office Action dated 5 July 9, 2008. An Appeal Brief was timely filed on October 22, 2008, and this Amended Appeal Brief is in response to the Notice of Defective Appeal Brief.

37 C.F.R. § 41.20(b)(2) FEE

The fee for the Appeal Brief, under 37 C.F.R. § 1.17(c), was previously submitted on October 22, 2008. Any additional fee, and any overpayments, should also be charged to 10 Deposit Account No. 50-1710.

This Amended Appeal Brief is being filed before the effective date of the changes to 37 C.F.R. § 41. (See 73 Fed. Reg. 74,972 (Dec. 10, 2008); see also 73 Fed. Reg. 32,938 (June 10, 2008)).

A. REAL PARTY IN INTEREST

The real party in interest to the above-identified application and to this appeal is the assignee, Chemtura Corporation.

5 **B. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

C. STATUS OF CLAIMS

Claims 34-45 are currently pending. Claims 1-33 have been previously canceled. Independent Claim 34 and dependent Claims 35-44 have been finally rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,703,193 to Rosenberg, et al. (“Rosenberg”). Dependent Claim 45 has been finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Rosenberg in view of U.S. Patent No. 4,624,996 to Rizk, et al. (“Rizk”) or U.S. Patent No. 4,101,473 to Lander (“Lander”). As previously indicated in the Appeal Brief filed on October 22, 2008, Appellants appeal the final rejections of Claims 35-45.

Claims 34-45 are reproduced in the Appendix submitted herewith.

D. STATUS OF AMENDMENTS

All amendments have been entered. No amendments have been made after the Final Office Action being appealed.

E. SUMMARY OF THE CLAIMED SUBJECT MATTER

The subject matter as recited by independent Claim 34 is a process for reducing the amount of residual diphenylmethane diisocyanate (MDI) monomer in a polyurethane prepolymer reaction product.¹ The process comprises adding at least one polyol to a stoichiometric excess of a dissolved MDI monomer in a solution at an NCO:OH ratio in the range of from about 2:1 to 20:1.² The solution comprises the diphenylmethane diisocyanate monomer and one or more inert solvents consisting of solvents having a boiling point about 1°C to about 100°C below the boiling point of the diphenylmethane diisocyanate monomer at a pressure of 10 torr.³ The one or more inert solvents may include dimethyl phthalate, diethyl phthalate, diisobutyl adipate, or dibutyl phthalate.⁴ The weight ratio of the one or more inert solvents to the diphenylmethane diisocyanate monomer ranges from about 75:25 to about 35:65.⁵

The process of Claim 34 further comprises reacting the polyol(s) with the dissolved diphenylmethane diisocyanate monomer to form a mixture.⁶ The mixture comprises polyurethane prepolymer reaction product, unreacted MDI, and one or more inert solvents.⁷

The process of Claim 34 further comprises distilling the mixture to strip the unreacted MDI to a level less than 0.3% by weight based on the combined weight of prepolymer, residual monomer, and residual one or more inert solvents.⁸ The one or more inert solvents comprise about 5% to about 85% by weight of the total weight of the combination of the mixture for forming the prepolymer reaction product plus solvents.⁹

In dependent Claim 45 the process further comprises adding at least one blocking agent to the stripped prepolymer. The blocking agent is selected from the group consisting of a ketoxime, a phenol, a lactam, or a pyrazole.¹⁰

¹ See Page 13, lines 2-4.

² See Page 13, lines 6-10; Page 15, lines 21-22; Page 15, lines 16-20.

³ See Page 13, lines 12-21; Page 14, lines 15-18.

⁴ See Page 13, lines 16-19.

⁵ See Page 14, lines 19-24.

⁶ See Page 1, lines 18-22; Page 15, line 1 to Page 17, line 2.

⁷ See Page 17, lines 3-5.

⁸ See Page 18, lines 9-13.

⁹ See Page 7, lines 16-19; Page 65, lines 7-9.

¹⁰ See Page 60, lines 2-9.

F. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether Claims 34-44 are anticipated by Rosenberg under 35 U.S.C. § 102(b).
2. Whether Claim 45 is unpatentable under 35 U.S.C. § 103(a) over Rosenberg in view of Rizk or Lander.

G. ARGUMENT

1. Claims 34-44 are Not Anticipated by Rosenberg under 35 U.S.C. § 102(b).

Independent Claim 34 and dependent Claims 35-44 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,703,193 to Rosenberg, et al. (“Rosenberg”). This rejection is improper because Rosenberg fails to teach every element of Claim 34.

a. Claim Construction

A determination that a claim is anticipated involves two analytical steps.¹¹ First, the Board must interpret the claim language. Second, the Board must compare the construed claims to a prior art reference to determine whether every limitation is found in that reference. In the present application, the Examiner has failed to properly interpret the claim language and thus failed to properly apply these analytical steps.

It is widely understood that during prosecution the examiners shall give claims the “broadest reasonable interpretation” consistent with the specification.¹² This interpretation must be *reasonable* so as not to include features that are excluded, especially when the claim narrows an element using the phrase “consisting of.” The phrase “consisting of,” in contrast to the open-ended phrase “comprising,” signifies the exclusion of unrecited components.¹³ Owing to their different meanings, the use of both phrases in a single claim has caused some confusion in the past, for example, when the phrase “consisting of” appears in a clause of the body of a claim and the transitional phrase “comprises” is used in the preamble.

This confusion was laid to rest in *Mannesmann Demag Corp. v. Engineered Metal Products Co.* In *Mannesmann*, the Federal Circuit held that when the phrase “consisting of” appears in a clause of the body of a claim and the open-ended transitional phrase “comprises” is used in the preamble, the exclusion effect of “consisting of” limits only the element set

¹¹ See *In re Crish*, 393 F.3d 1253, 1256, 73 U.S.P.Q.2d 1364, 1366 (Fed. Cir. 2004).

¹² See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005); *In re Crish*, 393 F.3d at 1256 (Fed. Cir. 2004) (“During patent examination, claims are given their broadest reasonable interpretation as they would be understood by one of ordinary skill in the art when read in light of the specification.”).

¹³ See *Conoco Inc. v. Energy & Environmental Int'l LC*, 460 F.3d 1349, 1360 (Fed. Cir. 2006).

forth in that clause and not other elements from the claim as a whole.¹⁴ Subsequent Federal Circuit decisions have consistently applied this claim interpretation principle from *Mannesmann*.¹⁵ The Board of Patent Appeals and Interferences also has repeatedly applied this interpretation when the phrases “comprising” and “consisting of” appear in a single 5 claim.¹⁶ Further, in one case in which the Board did *not* apply the *Mannesmann* claim construction principle, the District Court of Columbia reversed the Board, stating that interpreting a claim with both “comprising” and “consisting of” to include elements that are excluded by the phrase “consisting of” is wholly inconsistent with *Mannesmann*.¹⁷ In sum, 10 the proper construction of a claim having the transitional phrase “comprising” in its preamble and the phrase “consisting of” in the body of the claim in referring to a specific claim element is that the claim is open ended except as to the recited specific claim element.

In the present case, independent Claim 34 includes the open ended transitional phrase “comprising” in the preamble and includes the restrictive phrase “consisting of” in the body 15 of the claim in referring to the type of inert solvents employed in the process, as shown by the relevant portions of Claim 34 below.

A process for reducing the amount of residual diphenylmethane diisocyanate monomer in a polyurethane prepolymer reaction product **comprising** the steps of

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(A) adding at least one polyol to a stoichiometric excess of a dissolved diphenylmethane diisocyanate monomer in a solution at an NCO:OH ratio in the range of from about 2:1 to 20:1,

¹⁴ See *Mannesmann Demag Corp. v. Engineered Metal Products Co.*, 793 F.2d 1279 (Fed. Cir. 1986).

¹⁵ See *In re Crish*, 393 F.3d at 1257 (“The reasonable interpretation of the claims containing both of the terms ‘comprising’ and ‘consists’ is that the term ‘consists’ limits the ‘said portion’ language to the subsequently recited numbered nucleotides, but the earlier term ‘comprising’ means that the claim can include that portion plus other nucleotides.”). The Federal Circuit also applied *Mannesmann* in claim interpretation for infringement actions. See *Dippin’ Dots v. Mosey*, 476 F.3d 1337, 1343 (Fed. Cir. 2007) (finding that the presumption raised by the transitional phrase “comprising” cannot be used to give every element in the claim an open-ended meaning, especially when a claim element is narrowed); *Spectrum Int’l, Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1380 (Fed. Cir. 1998) (finding that while the transitional phrase “comprising” raises a presumption that the list of elements is nonexclusive, the phrase is not “a weasel word with which to abrogate claim limitations”).

¹⁶ See, e.g., *In re Rosenfeld*, U.S. App. No. 08/220,562, 1997 WL 33135341, 4 (B.P.A.I 2000) (unpublished) (citing *Mannesmann* the Board stated in reversing an anticipation rejection that “the Federal Circuit has provided meaningful guidance on how a claim such as applicants’ claim 1 should be construed.”); *In re Eicken*, U.S. App. No. 08/117,013, 1997 WL 33122284, 3 (B.P.A.I. 2000) (unpublished) (reversed rejection); *In re Joshi*, U.S. App. 08/367,565, 2001 WL 1255827, 2 (B.P.A.I. 2000) (unpublished) (reversed rejection).

¹⁷ See *Berenter v. Quigg*, 737 F.Supp. 5, 7 (D.D.C. 1988) (“An additional step that allows the use of the pesticide in an area other than the first habitat is inconsistent with the plaintiff’s claim.”).

5 wherein the solution comprises the diphenylmethane diisocyanate monomer and one or more inert solvents *consisting of* solvents having a boiling point about 1°C to about 100°C below the boiling point of the diphenylmethane diisocyanate monomer at a pressure of 10 torr,

The use of the open ended transitional phrase “comprising” in Claim 34 allows for the inclusion of other non-recited elements. One claimed element, however, is limited—namely the types of inert solvents that are employed in the solution of MDI. The “consisting of” language in Claim 34 clearly signals that the process is limited to using inert solvents having a boiling point of from about 1°C to about 100°C below the boiling point of the MDI monomer at a pressure of 10 torr. There can be no dispute that the “consisting of” language limits the solvents used in the process to those inert solvents having a boiling point within the recited range.¹⁸ The solvents that are used according to the claimed invention have a boiling point of from about 1°C to 100°C below the boiling point of MDI, i.e., 215°C (10 torr).¹⁹ For example, the following solvents may be used:²⁰

<u>Solvent</u>	<u>Boiling Point (10 torr)</u>
Dimethyl phthalate (DMP)	147°C
Diethyl phthalate	158°C
Diisobutyl adipate	168°C
Dibutyl phthalate	192°C

As noted in the specification, Examples 1-10 demonstrate the effectiveness of the claimed process with various types of polyols and a 50/50 solution of MDI and DMP.²¹ In comparison, Comparative Example A shows inefficient removal of MDI to a level of 0.35% without a solvent using high temperature (160°C) and very low pressure (0.004 torr).²² Comparative Example B shows inefficient removal of MDI using three distillation passes, no solvent and high temperatures (140-160°C).²³ Finally, Comparative Example C shows how using a higher boiling point solvent, diocyl adipate (DOA; 224°C), removed residual MDI

¹⁸ See 7-9-08 Office Action, pages 3-4 (“The examiner has set forth no position stating that the specific phrase governed by “consisting of” is open to the inclusion of other solvents.”).

¹⁹ See Page 13, lines 13-15.

²⁰ See Page 13, lines 17-19. These solvents are also recited in dependent Claim 44.

²¹ See Page 22, line 1 to Page 23, line 28.

²² See Page 24, line 15 to Page 25, line 6. Comparative Example A of the present application is similar to Comparative Example B in Rosenberg. (See Rosenberg, Col. 8, lines 15-30).

²³ See Page 25, lines 10-18. Comparative Example B of the present application is similar to Comparative Example C in Rosenberg. (See Rosenberg, Col. 8, lines 32-63).

to a level of 0.04%, but only reduced the DOA level to 7.6%.²⁴ In Comparative Example C the solvent is difficult to remove at temperatures low enough to prevent thermal degradation of the prepolymer.²⁵ These examples demonstrate the advantage of the process recited in Claim 34 of using *only* lower boiling points solvents relative to the boiling point of MDI.

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Claim 34 also recites that the MDI is used excess in the preparation of the polyurethane prepolymer reaction products, which leads to unreacted MDI in the elastomer.²⁶ Commercially available MDI prepolymers contain at least 5% of residual MDI.²⁷ Excess residual MDI leads to potential industrial hygiene issues (through inhalation and skin contact) and must be removed or reduced to an acceptable low level.²⁸ However, MDI is more difficult to remove than other diisocyanates due to its relatively higher boiling point.²⁹ MDI is an aromatic diisocyanate and as such is more thermally unstable than aliphatic diisocyanates.³⁰ The difficulties of removing residual MDI have been overcome by using the recited process in Claim 34, where *only* lower boiling points solvents relative to the boiling point of MDI are used. The solvents employed in the claimed process permit condensation of the distillate at temperatures above the melting point of MDI so as to prevent MDI solidification.³¹ In addition, the solvent permits the distillation to occur at a lower evaporator temperature to avoid thermal decomposition of the prepolymer reaction product during distillation.³²

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The Examiner, however, alleges that “other aspects of the claim are open to the inclusion of other solvents.”³³ In other words, the use of the open ended transitional phrase “comprising” in Claim 34, according to the Examiner, would allow the use of other solvents, such as solvents having a boiling point outside of the recited range. This interpretation is

²⁴ See Page 26, lines 3-16.

²⁵ See Page 26, lines 17-19.

²⁶ See Page 1, lines 18-22.

²⁷ See Page 2, lines 11-13.

²⁸ See Page 1, line 23 to Page 2, line 10. Also, excess MDI leads to decreased performance as shown in Examples 17-20 in Table 2 on page 38 and Comparative Example H on pages 31-32.

²⁹ See Page 2, lines 3-5. The boiling point of MDI is 215° C (10 torr), compared to TDI (120° C) and PPDI (110° C). See Page 26, lines 14-17.

³⁰ See Page 4, lines 6-21.

³¹ See Page 18, lines 4-6.

³² See Page 18, lines 1-8.

³³ See 7-9-08 Office Action, page 4.

unreasonably broad as understood by one of ordinary skill in the art when read in light of the specification, and is contrary to established Federal Circuit precedent, thereby abrogating claim limitations to render the “consisting of” language meaningless.³⁴

5 First, the standard for claim interpretation is to give the claims the broadest reasonable interpretation as the claims would be understood by one of ordinary skill in the art when read in light of the specification.³⁵ The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach.³⁶ A person of ordinary skill in the art reading the present application would clearly understand that the use
10 of **only** lower boiling point solvents relative to MDI, such as those recited in Claim 34, is taught by the present invention.³⁷ As stated on page 13 of the application, the “inert solvent should have a boiling point slightly lower than that of the diisocyanate monomer(s) under vacuum conditions.”³⁸ Also, the person of ordinary skill in the art reading the present application would clearly understand that the use of higher boiling point solvents relative to
15 MDI are specifically excluded by the present invention.³⁹ Appellants have amended Claim 34 to clearly limit the types of solvents as disclosed in the specification and have limited those solvents to exclude high boiling point solvents.⁴⁰ Thus, this is not a situation where a

³⁴ Further as a practical matter no subsequent court would construe Claim 34 as including a high boiling point solvent based on the amendments and arguments made by Applicants during the prosecution, as well as based on the specification and the claims as currently recited.

³⁵ See *In re Crish*, 393 F.3d at 1256.

³⁶ See *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999). See also *In re Marosi*, 710 F.2d 799, 802, 218 USPQ 289, 292 (Fed. Cir. 1983) (“Claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their ‘broadest reasonable interpretation’.”).

³⁷ See Page 18, lines 1-8; and Examples 1-10 on pages 22 and 23.

³⁸ See Page 13, lines 12-21.

³⁹ See Comparative Example C, page 25, line 20 to page 26, line 19 (“A solvent with a higher boiling temperature than MDI (such as DOA, bp 224°C) is apt to be difficult to remove at temperatures low enough to prevent thermal degradation of the prepolymer.”).

⁴⁰ The previously amendments submitted by Applicants and responses by the Examiner are summarized below:
a. 9-10-04 Response to amend Claim 1 (similar to currently pending Claim 34) to add “exclusively” before the *Markush* group. This was rejected under 35 U.S.C. § 112, 1st para., by the 12-15-04 Final Office Action.

b. 1-25-05 Response to amend Claim 1 to state “one or more inert solvents, said solvent or solvents being selected from the group consisting of.” Insufficient to overcome rejection under 102(b) as being anticipated by Rosenberg in 3-29-05 Office Action.

c. 9-28-05 Response arguing that the solvents are limited. In 12-8-05 Final Rejection, the Examiner responded by stating there “is no language that precludes an additional dissolving step or step of adding additional solvents. Despite applicants’ remarks it is by no means clear the claim language definitively excludes the argued additional solvent.”

d. 1-23-06 Response to added a limitation that “all solvent(s) employed in said process” are low boiling point

limitation of the specification is being read into the claim to narrow the claim. Instead that claim limitation, read in light of the specification, is clearly present in Claim 34 through the use of “consisting of.” The interpretation that Claim 34 is limited to lower boiling point solvents relative to MDI is consistent with what a person of ordinary skill in the art would 5 understand to be the broadest reasonable interpretation of Claim 34 and is consistent with the specification. Therefore, the broadest reasonable interpretation of Claim 34 consistent with the specification is that the claimed process is limited to the use of inert solvents having boiling points within the recited range.

10 Second, Federal Circuit precedent makes clear that the proper construction of “consisting of” in the body of a claim is that the element is restricted to those features that follow, and to interpret a claim to allow for the possible inclusion of an additional element of the same type but which does not possess the specified features would be improper. As recited by Claim 34, the solvents employed consist of “solvents having a boiling point about 1°C to 15 about 100°C below the boiling point of the diphenylmethane diisocyanate monomer at a pressure of 10 torr.” As agreed to by the Examiner, this claim language expressly *excludes* the use of any solvent having a boiling point that is greater than about 1°C or less than about 100°C from the boiling point of MDI. Accordingly, as in *Mannesmann*, Claim 34 is limited to using only the recited lower boiling point solvents, and the Examiner’s interpretation that 20 the claims could include high boiling point solvents is improper and inconsistent with Federal Circuit precedent.

solvents. Rejected under 112 by the 6-15-06 Office Action, which stated that the “examiner has found insufficient support for stating that all solvents employed with the “entire” process have the claimed boiling point property.”

e. 9-11-06 Response to amend the limitation that “all solvent(s) employed in step D” are low boiling point solvents. The 112 rejection was maintained by the 11-30-06 Final Office Action.

f. 12-27-06 Response to add a first low boiling point solvents in step A and a second low boiling point solvents in step D of Claim 1. The 112 rejection was maintained by the 3-29-07 Office Action .

g. 5-17-07 Response to add new Claim 34, based on Claim 1. In 8-8-07 Final Office Action, the Examiner maintained the 102(b) rejection as being anticipated by Rosenberg.

h. 10-31-07 Response to add a solution and the solution comprising solvents “consisting essentially of” low boiling point solvents. In a 1-2-08 Interview the Examiner maintained the position that “the claims as drafted fail to conclusively exclude the argued high boiling point solvent.” The 102(b) rejection as being anticipated by Rosenberg was maintained in the 1-7-08 Office Action.

i. 3-20-08 Response to amend the “consisting essentially of” to “consisting of.” In 7-9-08 Final Office Action the Examiner maintained the 102(b) rejection as being anticipated by Rosenberg.

Claim 34 is similar to the claim at issue in *Bertener v. Quigg*, which applied the *Mannesmann* holding during prosecution. In *Bertener*, the claim stated:

A method for treating an infestation of cockroaches selected from the species Periplaneta americana, Periplaneta australasiae, and Blatta orientalis, said species being characterized in that a first habitat of these species during early development and reproduction is different from a second habitat of these species during a postmigratory stage, to substantially eliminate said infestation and prevent its spread to beyond the locus thereof, which **comprises**

5 identifying said first habitat, and

10 applying lethally effective amount of pesticide to an area **consisting of** said first habitat,

whereby to exterminate any cockroaches of said species present in said area and substantially prevent further reproduction thereof.

The court found that the claim was open ended due to the use of the transitional phrase "comprising."⁴¹ The applicant argued that the claim was also closed with respect to the second step. The USPTO disagreed and asserted that the claim was open ended and could include unspecified steps including possible treatment of cockroach habitats outside of the first habitat.⁴² Citing *Mannesmann*, the court agreed with the applicant's interpretation.⁴³

20 The Examiner's arguments in the present application are strikingly similar to those made by the USPTO and rejected in *Berenter*, and, thus, are also similarly inconsistent with *Mannesmann*. The solvents that may be used in the process of Claim 34 are clearly limited to lower boiling point inert solvents relative to MDI, and to interpret the Claim as to allow for the possible inclusion of solvents having higher or lower boiling points relative to the 25 diisocyanate, as the Examiner suggests, is improper.

Appellants have amended the claims during prosecution to add the phrase "consisting of" to limit the solvents to those having "a boiling point about 1°C to about 100°C below the boiling point of the diphenylmethane diisocyanate monomer at a pressure of 10 torr."

30 Following *Mannesmann*, Claim 34 limits the solvents through the phrase "consisting of" but

⁴¹ See *Berenter*, 737 F.Supp. at 6.

⁴² See *Berenter*, 737 F.Supp. at 6.

⁴³ See *Berenter*, 737 F.Supp. at 6 ("[T]he plaintiff's claim limits the use of the pesticide to only the first habitat. An additional step that allows the use of the pesticide in an area other than the first habitat is inconsistent with the plaintiff's claim.").

otherwise remains open-ended. Based on the foregoing analysis, it would be unreasonable and improper to interpret Claim 34 to include additional solvents as the Examiner has done. Such an interpretation would abrogate claim limitations and would be unreasonably broad, going beyond what the Appellants are clearly claiming in Claim 34. Appellants are clearly 5 claiming the use of **only** solvents having a low boiling point and have narrowed the claims accordingly. Thus, the “broadest reasonable interpretation” of Claim 34 must limit the solvents to those specifically recited in Claim 34.

10 The Examiner further alleges that Rosenberg “makes clear that the solvents may be added at the start of the prepolymer synthesis or any time during reaction prior to distillation (see column 6, lines 13-15, 42, and 43).”⁴⁴ This allegation is irrelevant to the interpretation of Claim 34. Claim interpretation is not controlled by the teachings of the cited references. Instead Claim 34 has been amended to specifically exclude solvents having boiling points 15 outside of the recited range, and it would be inconsistent with the clear meaning of Claim 34 to add another solvent as alleged by the Examiner. Thus, regardless of what Rosenberg teaches, Claim 34 is clearly closed ended with respect to the inert solvents that may be employed.

20 Further, Claim 34 includes the step of “adding at least one polyol to a stoichiometric excess of a dissolved diphenylmethane diisocyanate monomer **in a solution...**,” and indicates that the solvents in the solution consist of lower boiling point inert solvents relative to MDI. Thus, regardless of when the solvent is added, the solution still must have solvents consisting 25 of the lower boiling point inert solvents relative to MDI. Claim 34, properly construed, does not read on the addition of higher boiling points solvents relative to the diisocyanate as taught by Rosenberg at any point in the process.

30 In summary, the Examiner’s interpretation of independent Claim 34 is improper and inconsistent with Federal Circuit precedent. The only reasonable interpretation of Claim 34 consistent with the specification is that it is limited to the use of inert solvents having a boiling point within the recited range.

⁴⁴ See 7-9-08 Office Action, page 3.

b. Anticipation Analysis

Once the claims are construed, anticipation under 35 U.S.C. § 102 requires that the Board must compare the construed claim to a prior art reference and make factual findings 5 that every limitation is found in a single reference.⁴⁵ In the previous Office Actions, the Examiner relies on Rosenberg for allegedly teaching all of the features of Claim 34. Rosenberg, however, requires the use of ***both higher and lower*** boiling point solvents relative to the diisocyanate monomer used.⁴⁶ In contrast, as discussed above, the process of Claim 34 properly construed is limited ***exclusively*** to inert solvents having boiling points that are ***lower*** 10 than MDI. Thus, Rosenberg fails to teach or suggest all of the features of Claim 34 or the claims depending therefrom.

The Examiner has not and cannot cite any portion of Rosenberg for teaching or suggesting the use ***exclusively*** of solvents having a boiling point lower than the diisocyanate 15 monomer employed. Instead, the Office Action relies on an improper interpretation of Claim 34 and alleges that:

[A]pplicants' 'comprising' language causes the claims to be open to the inclusion of additional components and processing steps, including the use of the argued additional solvent of [Rosenberg].
20 It is by no means clear that the argued 'consisting of' language is adequate to exclude the argued solvents from the full scope of the claim.⁴⁷

Without relying on this improper interpretation of Claim 34, the Office Action cannot cite Rosenberg or any other reference for teaching every element of Claim 34. As indicated 25 above, Rosenberg requires the use of a combination of higher and lower boiling point solvents relative to the diisocyanate.⁴⁸ Further, Rosenberg clearly shows that ***only*** using a high boiling point solvent or ***only*** using a low boiling point solvent to remove paraphenylene diisocyanate

⁴⁵ See *In re Crish*, 393 F.3d at 1256.

⁴⁶ See Rosenberg, Col. 4, lines 20-24.

⁴⁷ See 7-9-08 Office Action, page 3.

⁴⁸ See Rosenberg, Col. 4, lines 20-24.

(PPDI) are equally unsuccessful.⁴⁹ Thus, Rosenberg cannot be cited for teaching *only* the use of lower boiling point solvents relative to MDI in the removal of residual MDI, and thus cannot anticipate every element of Claim 34.

5 As stated above, Claim 34 has been improperly interpreted in the outstanding Office Action. Applying the proper interpretation of Claim 34, Rosenberg fails to teach every element of Claim 34, and this rejection must be withdrawn as improper.

10 **2. The Combination of Rosenberg, Rizk and Lander Fails to Teach Every Element of Claim 45 and Claim 45 is Patentable under 35 U.S.C. § 103(a) Over Rosenberg in View of Rizk or Lander.**

15 Dependent claim 45 has been finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Rosenberg in view of U.S. Patent No. 4,624,996 to Rizk, et al. (“Rizk”) or U.S. Patent No. 4,101,473 to Lander (“Lander”).

Rizk and Lander are only cited for teaching blocking agents and fails to teach the use of a low boiling point solvent in the process as recited in Claim 34. Therefore Rizk and Lander cannot remedy the deficiencies of Rosenberg with respect to Claim 34 and Claim 34 is patentable over the combination of Rosenberg, Rizk and Lander.

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⁴⁹ See Rosenberg, Col. 9, lines 35-56 (unsuccessful removal of residual PPDI using only high-boiling point solvents); Col. 9, line 58 to Col. 10, line 6 (unsuccessful removal of residual PPDI using only low-boiling point solvents).

CONCLUSION

In view of the above, Appellants submit that Rosenberg fails to teach every element of Claims 34-44 under 35 U.S.C. § 102(b). Specifically, Rosenberg fails to teach the exclusive use of lower boiling point solvents relative to MDI, i.e., without the use of a higher boiling point co-solvent, as presently claimed. Further, Rizk and Lander fails to remedy the deficiencies of Rosenberg and the combination cannot teach every element of Claim 45 under 35 U.S.C. § 103(a). Accordingly, reversal of the final rejections, allowance of the rejected claims, and issuance of the subject patent application are respectfully requested.

Appellants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 625-3500. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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Please continue to direct correspondence to:

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I. CLAIMS APPENDIX

1-33. (Canceled)

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34. (Previously Presented) A process for reducing the amount of residual diphenylmethane diisocyanate monomer in a polyurethane prepolymer reaction product comprising the steps of

(A) adding at least one polyol to a stoichiometric excess of a dissolved diphenylmethane diisocyanate monomer in a solution at an NCO:OH ratio in the range of 10 from about 2:1 to 20:1, wherein the solution comprises the diphenylmethane diisocyanate monomer and one or more inert solvents consisting of solvents having a boiling point about 1°C to about 100°C below the boiling point of the diphenylmethane diisocyanate monomer at a pressure of 10 torr, wherein the weight ratio of the one or more inert solvents to the diphenylmethane diisocyanate monomer ranges from about 75:25 to about 35:65,

15 (B) reacting said polyol(s) with said dissolved diphenylmethane diisocyanate monomer to form a mixture comprising polyurethane prepolymer reaction product, unreacted diphenylmethane diisocyanate, and said one or more inert solvents, and

(C) distilling the mixture comprising polyurethane prepolymer reaction product, unreacted diphenylmethane diisocyanate, and said one or more inert solvents to strip the 20 unreacted diphenylmethane diisocyanate to a level less than 0.3% by weight based on the combined weight of prepolymer, residual monomer, and residual one or more inert solvents, wherein the one or more inert solvents comprise about 5% to about 85% by weight of the total weight of the combination of the mixture for forming the prepolymer reaction product plus solvents.

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35. (Previously Presented) The process of claim 34 wherein the monomeric diphenylmethane diisocyanate is at least one isomer of diphenylmethane diisocyanate.

36. (Previously Presented) The process of claim 35 wherein the one or more inert solvents are selected from the group consisting of organic aromatic esters, aliphatic esters, and mixtures thereof having boiling points in the range of from about 115°C to about 214°C at 10 torr.

5 37. (Previously Presented) The process of claim 35 wherein the distillation step comprises at least three agitated film vacuum distillation stages in series, each at an evaporative temperature of up to 150°C.

10 38. (Previously Presented) The process of claim 34 wherein the prepolymer contains less than 0.1% by weight of unreacted diphenylmethane diisocyanate monomer based on the combined weight of prepolymer, residual monomer, and residual one or more inert solvents after stripping.

15 39. (Previously Presented) The process of claim 34 wherein the prepolymer contains less than 0.05% by weight of unreacted diphenylmethane diisocyanate monomer based on the combined weight of prepolymer, residual monomer, and residual one or more inert solvents stripping and comprises at least 80% of the theoretical NCO content for a pure ABA structure.

20 40. (Previously Presented) The process of claim 34 wherein the polyol or polyols are selected from the group consisting of polyesters of adipic acid; polyethers of ethylene oxide, propylene oxide, or tetrahydrofuran; polycaprolactones; polycarbonates; hydrocarbon polyols; and mixtures thereof; said polyol or polyols having a number average molecular weight in the range of from about 400 to about 5000.

25 41. (Previously Presented) The process of claim 34 wherein the polyol or polyols comprise at least one component having a low molecular weight in the range of from about 62 to about 400, and selected from the group consisting of ethylene glycol, isomers of propylene glycol, isomers of butane diol, hexanediol, trimethylolpropane, pentaerythritol, poly(tetramethylene ether) glycol, diethylene glycol, triethylene glycol, dipropylene glycol, tripropylene glycol, 30 and mixtures thereof.

42. (Previously Presented) The process of claim 41 further comprising at least one polyol having a high number average molecular weight in the range of from about 400 to about 5000.

43. (Previously Presented) The process of claim 42 wherein the molar ratio of the low 5 molecular weight polyol to the high number average molecular weight polyol is in the range of from about 0.25 to about 2.5: 1.

44. (Previously Presented) The process of claim 34 wherein the one or more inert solvents are selected from the group consisting of dimethyl phthalate, diethyl phthalate, diisobutyl adipate, 10 and dibutyl phthalate.

45. (Previously Presented) The process of claim 34 further comprising the step of adding at least one blocking agent selected from the group consisting of a ketoxime, a phenol, a lactam, or a pyrazole to the stripped prepolymer.

II. EVIDENCE APPENDIX

No evidence is submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132.

III. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.